

## Aquarius Radiometer Delivered to JPL (January 2008)

After a four-year development effort, the NASA Goddard Space Flight Center (GSFC) has delivered the Aquarius Radiometer to the Jet Propulsion Laboratory (JPL) in Pasadena, California for integration with the Aquarius instrument. The Radiometer, built by an in-house team of scientists, engineers, and technicians at GSFC is part of the international Aquarius/SAC-D mission.

"The Aquarius/SAC-D mission is designed to investigate the links between the ocean circulation, the global water cycle and climate variability by making unprecedented global measurements of sea surface salinity for up to three years. Salinity remote sensing signatures are quite small and present a difficult measurement challenge. Accordingly, the Aquarius microwave radiometer has very exacting requirements for low noise and calibration stability, and will be the most accurate (by about an order of magnitude) ever developed for earth remote sensing," according to Dr. Gary Lagerloef, Aquarius Principal Investigator.



*Aquarius Radiometer in a Goddard Space Flight Center "clean room"*

The Aquarius Radiometer is comprised of individual Dicke radiometers that use noise injection for calibration. A critical requirement in the design of these radiometers is long-term (days) stability. Stability is critical because significant averaging must be done to achieve the Aquarius goal for an accuracy of 0.2 psu (practical salinity units) over a monthly basis. To achieve this, the design requirement set for Aquarius is that the radiometers be stable to within 0.13K

over 7 days. A primary element in maintaining stability is adequate internal calibration and good thermal control. The design adopted for the Aquarius radiometers is based on research conducted under NASA's Instrument Incubator Program.

"The basic concepts of this measurement were outlined back in the '70s. It took 30 years for technology to catch up to the point of making this mission practical. In more recent years collaboration between GSFC and JPL demonstrated the ability to build these very stable radiometers. Developing the state-of-the-art Aquarius Radiometer has been a difficult but rewarding experience for the team.

Aquarius will significantly contribute to our understanding of the Earth's oceans, and we all feel extremely proud to be a part of it," said Fernando Pellerano, the Radiometer Instrument System Engineer.

Upon completion of its functional testing at JPL, the Radiometer will be formally transferred to JPL for integration with the Aquarius instrument. "We are excited about the upcoming marriage of the radiometer with the rest of the instrument and having it all work as an integrated flight instrument," according to Steven Bard, Program Manager of JPL's Earth Explorer Missions Office.

Aquarius/SAC-D is an international collaboration between NASA and CONAE, the national space agency of Argentina. It is scheduled for launch in May, 2010.



*Aquarius Radiometer Team at Goddard Space Flight Center (Greenbelt, MD)*